THE THEORY OF WAGES.[1]

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I.

Little over a century has elapsed since the study of Political Economy acquired something of scientific shape at the hands of Adam Smith. In that time its teachings have exerted a widespread influence in many directions, and some of them have obtained an acceptance scarcely less unanimous than that accorded to the best established truths of the physical sciences. In other directions its doctrines have made their influence little felt, and have, in spite of the sincerity and the earnestness with which they have been preached, failed hitherto to carry persuasion to those whom they most closely concern.

Especially is this true of the theory of wages. A few decades ago the wages fund theory was generally received by economists as a final solution of the question. For many years it held the field without a rival. Never, however, was it generally accepted by the laborers, who are the very people who have for sale the article whose price it was supposed to fix; and to-day while by many economists it is, with one modification or another, still cherished, it is by a very influential portion of the

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younger and more progressive spirits absolutely rejected. No new theory however has taken its place among the established principles of the science, and the greatest differences of opinion exist even between writers of acknowledged authority. If this be true of the teachings of Political Ecomomy on a matter of such supreme interest, is it surprising that a science speaking with so uncertain a voice should fall into disrepute, and that its precepts should often go unheeded?

It is not to be supposed that the clearest and most convincing exposition of scientific truth would entirely allay the elements of social strife. Yet no careful observer of human affairs will deny the great influence of theory upon conduct. That in just such subjects as the present its force may be very great, is abundantly shown by the history of modern Socialism and of its allied movements, as evidenced by the currency of such writings as those of Karl Marx, and Henry George. Is it then too much to hope that the discovery and acceptance of a true theory of wages would go far to aid in a practical solution of labor troubles, and might serve in some measure to calm the fruitless struggle between labor and capital, and to direct the energies thus wasted into channels where they would add to the productiveness of industry and to the common welfare of all classes,—of those, alike, which receive, and of those which pay wages?

There are really two wages questions. There is, to use the language of Mr. Ricardo, a natural price of labor, and there is a market price of labor. The

first is the rate which would in the long run prevail, if the influence of price upon supply had time and opportunity to take effect without the intervention of disturbing causes. The principles which regulate the natural price are commonly treated separately, and form a large part in discussions of the theory of populatio.n When the law of wages simply is spoken of, there is usually a tacit intention to refer not to natural but to market wages. On the present occasion at least, it is to the law of market wages that I shall ask your attention. The necessity of establishing such a law is obvious, and will be readily acknowledged, in view of the length of time needed for any of the causes which influence population or the supply of labor to produce their effect upon price.

II.

The market price of labor is that price which prevails at any given time in virtue of the existing supply and demand. Now at any given time the supply of labor is a fixed quantity. A change of price will not cause it to vary. But price can only be in equilibrium on the condition that supply and demand are equal; and where these are not equal, equilibrium can only be reached by the action of price upon one or the other of them. As it cannot, in this instance, act upon supply, it must, if it acts at all, act upon demand. In the case of everything else which is bought and sold, it is acknowledged that the demand varies under the influence of price. No one will question that, other things being equal, people will be better clad if coats

are cheap; and that if houses are cheap, people will be better lodged. Certainly no one would deny that the demand for steam engines and for horses varies with their prices; and if this be true of the labor of beasts and of inanimate machines, what can prevent that it should be equally true of the labor of men? Human labor, indeed, consists only in moving objects where they are wanted, the very thing that is accomplished by the labor of horses and of locomotive engines.[1]

Labor is generally disagreeable to perform. But that is no reason for buying it. That gives it no exchange value. The source of value must lie somewhere else. Indeed were labor pleasant instead of irksome, those who have it for sale would scarcely abate a jot of the price. People buy labor for one of two reasons. The first reason is that it can perform agreeable services which they enjoy receiving. When so employed, it is often called unproductive, because it is not embodied in any material commodity. The only other reason for buying labor is in order to create wealth, and this end is accomplished whenever by its services it confers upon some material object a value greater than the price which is paid to it for doing so. Labor so sunk or fixed in material objects is said to be productive. But such objects are themselves destined to be used like unproductive labor, in gratifying human desires.

No labor will be sold unless it pays somebody to buy it. Rather than abandon its use the buyer would prefer to pay for each particular act of

[1]As an illustration of this, Dr. Patton suggests to me that it has been recently stated in the *Seminar* of the Wharton School, that in certain mining and manufacturing towns in Pennsylvania the demand for Hungarians depends upon the price of mules.

labor, a sum in proportion to its real utility to himself. But it does not follow that he must always pay so much as this. Nor does it follow that labor as a whole is paid the full price which employers could afford to give rather than dispense with it entirely. The price of all labor is regulated, as are the prices of all commodities, by its final utility; by the utility, that is, of the portion which comes into use last; that portion, in short, whose services are least useful and least highly valued.

What then is the measure of the final utility of labor? How much will men pay for the least useful or least productive portion of labor? Or in what other directions could they expend with equal satisfaction the sums now devoted to its purchase? The first portion of labor used has immense utility; it is, in fact, indispensable; the next portion, and the next, may also be well nigh indispensable; but subsequent ones are not; and each succeeding portion can be more easily and cheaply dispensed with than the last, while industry goes on, and labor's services are replaced by other productive agents in the shape of auxiliary capital. It may be that exactly the same thing which was formerly done by labor will now be done by a machine; or that some other change will be made in the organization of industry, whereby larger sums of capital shall be united in production with smaller amounts of labor. Or again it may happen that the substitution of capital for labor is brought about by a change in the direction of consumption. Whether labor is used or capital, depends in each case upon the relative hire which must be paid for them. The final utility of labor will be found in those of its actual employments where it has the least advantage

over the use of auxiliary capital. Let us examine more closely where this point is to be found.

There are two ways in which the demand for labor can be diverted into other channels. One is in production, whose methods are decided by the desire of producers to obtain every object with the least possible outlay. The other way is through the influence of unproductive consumption, whose objects are liable to vary according to their prices, because people desire to employ their means in such manner as to obtain the greatest possible gratification.

If any one, who hires labor and uses it unproductively, should find a way to obtain a greater satisfaction by some other form of expenditure, he will change to it. If, for example, some one who hires a gardener at five hundred dollars a year were to discover that the same sum would furnish him with something else which would give him more pleasure, he would discharge his gardener and buy the other thing. The demand for labor would be lessened, but by how much it would be lessened would depend upon the application which he might make of the money saved. If he were to buy fresh vegetables, the greater part of the sum would still go to pay for labor, while a small part only would go to pay interest on capital. If he were to buy coarse cotton goods, less would go to wages and more would go to interest than in the case of vegetables. If he were to buy cutlery, a still larger part would probably go to interest and a smaller amount would go to wages than in the case of coarse cotton goods. If, again, he were to buy tea, he would occasion a demand for whatever commodities we export to China, to pay for

the tea that comes from thence. If we pay for our Chinese imports in grain, a small part of what went formerly to wages would go now to interest, while if we pay in cotton goods or cutlery, a larger part would go to interest.

A similar result occurs whenever unproductive expenditure changes from articles like green vegetables, whose price consists mostly in wages, to other articles like cotton cloth or copper, where price consists more largely of interest or rent. All articles are produced by the coöperation of labor and of capital, but it may be that no two articles are produced by exactly the same proportions of them. As consumption happens to be of those articles into whose production labor enters more largely, or of those other articles into whose production the use of capital enters more largely, just in such proportion does it occasion a large or a small demand for labor.

Not only do industries which produce different articles involve the use of different proportions of labor and of capital, but the very same articles also may often be produced by different methods which involve the use of different proportions of labor and of capital. Very many things which are now done by the use of capital could be done by labor, and many things which are now done by labor could be done equally well by the use of capital. If one or other of them is used exclusively in any case, this is not because it alone can accomplish the desired purpose, but because it can do so more cheaply than the other. Where railroads are established, they certainly in most cases carry goods more cheaply by far than porters or pack animals can do. Yet there are some countries where carriers and

asses compete successfully with existing railroads, and there are others where these primitive means of conveyance are yet undisturbed by the competition of the steam engine and the iron road. So also power looms and nail machines have generally supplanted hand looms and hand made nails; but under some circumstances hand methods are, or were recently, more economical in these trades.

This competition of capital with labor is not confined to the case of machinery. It exists wherever there is a question as to the length of time over which a productive operation shall be prolonged; for every such prolongation involves the accumulation and retention of greater stocks of material, as in the cases of aging wine, seasoning lumber, and curing leather. The same competition exists wherever there is a question of erecting costly buildings which save labor, or which at least absorb large amounts of capital which might otherwise create a fresh demand for labor. By the erection of the bridge over the Frith of Forth, and of the Philadelphia City Hall, vast sums ranging from ten to fifteen millions of dollars in each case, have been withdrawn from the maintenance of labor. In the case of the Forth Bridge, it is thought that this capital is productively spent. I wish that as much could be said of the Philadelphia City Hall.

Where demand can be diverted from the purchase of labor, and can be directed to the employment of auxiliary capital in the production of the same commodities, the decision between using one or the other depends upon the cost of doing so, and upon that cost alone. Where however the decision depends upon the choice between different objects of unproductive expenditure, the relative demand for labor and for

the use of capital will not depend solely upon the existing rates of wages and of interest, but will depend in part also upon taste. To turn again to an example already given, the choice between employing a gardener and buying cotton or copper goods, depends in no small degree upon the price of each of these various things, but it also depends in great part upon the degree of appetite for each of them. But where the choice is between using capital and using labor in any one branch of manufacture, as, for instance, in the production of carpets or of nails, the decision between them will in any given state of the arts depend upon their relative hire, and upon that exclusively; for, as between two methods of obtaining the same result, cheapness must be the sole guide.

The conclusion is inevitable, that if labor is is dear, people will discard it to a greater or less extent. They will find new methods whereby the same results can be had by using more capital and less labor. They will also abandon the employment of unproductive labor, and the consumption of articles produced mainly by labor, and will consume instead a greater amount of the articles into whose production capital largely enters.

To every different imaginable price for labor there corresponds a different amount of effective demand. Every rise in the price of labor restricts its uses and curtails the demand; every fall in price creates new uses and increased demand. But either a rise or a fall sets influences at work which restrict its own extension.

Where then we may ask is the equililibrium of price to be found? Or at what price will the demand be just equal to the amount of the

existing supply? This, of course, can only be at such a price, that it is impossible for employers to get any advantage by substituting capital for labor, or labor for capital.

The relative advantages of labor and of capital vary so greatly in their different uses, that whatever may be their hire at any time, it will in most of their employments be impossible to substitute one for the other, unless a vast change should occur in the relative price of using them. In a considerable number of cases, however, their relative advantages are less great, and in some they are quite small. In such cases a moderate change in wages or interest will induce substitution of one for the other.

In yet other cases, these relative advantages of labor and capital disappear entirely. In them the amounts of labor and capital which will do the same work can be hired for the same price, and employers give no preference to one over the other, but use either indifferently. In these employments it may be said of labor as of capital also, that each is here at its final utility. For in every other use of labor its utility is greater as compared with that of auxiliary capital than what it is here, and the utility of capital is in all its other uses greater as compared with that of labor than what it is in this use.

Just as the final utility of any other commodity, the utility, that is, of the last portion used, fixes the prices of the whole supply of that commodity; so the relative final utilities of labor and of capital fix their relative prices; and the wages of labor and the interest on capital are the same in all their employments as they are here.

We may state this law of wages in the following terms: *The price of a given amount of labor is the same as the price paid for the use of such amount of capital as would replace that labor in those employments where labor and capital are interchangeable and where either can be used to equal advantage.*

It might seem that we had now reached the final solution of the wages question, and that in order to ascertain the price of labor, it would further be necessary only to observe where the interchange of labor and capital occurs. Since the hire of a day's labor is the same as the hire of such a quantity of capital as is there interchangeable with it; it would only be necessary when this amount of capital is ascertained, for us to compute how much the interest on it would be. Such a procedure would end the question very neatly; but, unfortunately, it assumes a knowledge of two things, both of which are really unknown. It assumes in the first place that we know what amount of labor and capital are actually interchangeable with each other; and it also assumes that the rate of interest can be ascertained independently of any knowledge of the rate of wages. A little consideration, however, of what has preceded will show that the rate of interest depends on the price of labor in exactly the same degree and manner that the price of labor depends on the rate of interest. Neither of the two can be ascertained independently of the other. The problem of wages and the problem of interest cannot be separated. The solution of each is involved in the solution of the other, and both will be simultaneously solved so soon as it is shown what are the amounts of labor

and of capital which are interchangeable. This question still remains for us to attempt.

What then is the value of our formula and to what use can it be put?

It is valuable because it disposes of certain erroneous assumptions, which play a part in some of the theories of wages. It shows, in the first place, that the amount of labor which people want to buy, and do buy, depends in part upon its price; and it disproves any theory inconsistent with this fact. It shows, in the second place, that the division of capital into an auxiliary fund and a remunerative fund does not take place independently of the price of labor; and that consequently any theory must be at fault which implies such an assumption. It shows, in the third place, that the problems of wages and of interest are one and the same, and that since it is not possible to ascertain the amount of either one of them apart from the amount of the other, so therefore neither of them can be properly treated as a mere residuum which is left after defraying the other out of the total product of industry. And although it may not itself acquaint us with the rate of wages, it is of the utmost use in pointing out the way in which we must search for that rate. It exhibits the instrumentality through which the price affects the demand, and by so doing it supplies the element which has hitherto been lacking to the theory of wages,—a knowledge, that is, of the conditions with which price must comply in order to make demand equal supply.

Where the supply of anything is a fixed amount, it has long been known that whenever the demand exceeds it, the high price ensuing causes such a

reaction, as again to reduce the demand to the limit of the existing supply. And it has been recognized that this is principally accomplished by the influence of price in inducing buyers to substitute some other object of desire or consumption for that which they had originally intended. Otherwise equilibrium in price, and equality of supply and demand, which is the condition of that equilibrium, could never be reached.

Until the present time, however, the possibility of finding a substitute for labor has not been recognized. Were no such substitute to be had, the law of supply and demand could not operate in its usual manner. The failure of economists to recognize the possibility of finding a substitute, must explain why they have sought outside of the equation of supply and demand for the principles which dictate the law of wages. It is to supply their omission that the preparation of this paper has been undertaken. But the principle of the interchangeability of labor and capital, which I have laid down, is not itself one of the causes of the demand for labor; it merely serves to strike the balance between the elements which constitute that demand. It is like the governor on an engine, which itself furnishes no power but which regulates the power supplied by other agencies.

We will now turn to a consideration of what those agencies are.

III.

Although the ultimate causes affecting wages were most of them long since observed, and although their nature has been the subject of prolonged dis-

cussion, economists, for want of a proper clue to the mechanism by which their operations are coördinated, have failed to settle any well established body of scientific truth, or even to come to any general agreement in their own teachings, concerning them.

They have not even made it clear whether wages and interest generally vary alike, rising and falling together, or whether such rise as may take place in the one is usually accompanied by a fall in the other. It was said by Mr. Ricardo that "nothing can affect profits but a rise in wages," and that "in proportion as wages rose, profits would fall." These sayings gained a widespread acceptance among the older economists. Business men and laborers on the other hand, in conducting their own affairs, have frequently assumed that wages and profits commonly rise and fall together. So firmly is this opinion held, that when contracts are made for labor covering considerable periods of time in advance, it is quite usual to stipulate a sliding scale whereby the wage rises or falls with the price of the finished product.

How are we to explain this difference of opinion between theorists and practical men? Is that which seems to be true in theory false in practice? Or is it not rather true, that of the causes which affect wages and interest (or profits, to use Ricardo's phraseology), some affect both in the same way, but others affect them in opposite ways? The latter answer is no doubt the true one. Some of the variations in wages and interest do happen concurrently in both, so that labor and capital gain or lose alike in their compensation. Other variations take place in opposite directions, so that whatever is gained by labor or by capital is only gained by one at the expense of the other.

The interchangeability of labor and capital affords a touchstone by which we can discriminate between the causes which act in these two different ways. Whatever affects wages or interest, and yet suffers the same amount of labor and of auxiliary capital as formerly to interchange at equal cost, must affect wages and interest alike. On the other hand whatever alters this rate of interchange affects wages and interest divergently.

The first class of causes may all be summed up in the productiveness of industry. At some one place, or one time, given amounts of labor and capital, obtain a far greater return than what they do at some other place, or other time. Every comparison which is made of the welfare and of the industrial condition of different countries and of different epochs is an illustration of this truth.

The differences in the productiveness of industry are due either to differences in the abundance with which nature spreads her bounties, or to differences in the effectiveness of the methods by which men turn these to account. But unless they are accompanied by differences in the relative efficiency of capital and labor as compared with each other, differences in the productiveness of industry afford no reason for any alteration in the rate of interchange of labor and capital. The same amounts of labor and of capital which were formerly compensated equally, still are so, and the product is distributed between labor and capital in the same proportions as before. To whatever extent interest rises or falls, wages rise or fall in the same degree.

I just said that variations in the productiveness of industry are due to variations in the abundance of

the resources of nature and of man's skill in utilizing those resources. Their overwhelming importance in determining the welfare of mankind is thoroughly established, and has been fully set forth in the writings of the President of this Association. For that reason and also because they figure less largely in the dispute between different classes of society, I shall not allow them to detain me longer here, but shall pass on to the enquiry into those influences which affect wages and interest in opposite ways.

If at one time or place, interest, or the hire of capital, is higher in proportion to wages, or the hire of labor, than it is at another time or place, this can only be because men are relatively more anxious to acquire the use of capital in the one case than in the other; and this greater anxiety is aroused either because capital is harder to get as compared with labor, or else because it is more useful. In the first case the change is due to a change in the relative supplies of capital and of labor; in the latter case it is due to a change in the conditions under which industry is prosecuted.

We will first consider the latter case, and here we may observe that the utility of labor or of capital is itself the resultant of two things. In order to be useful, labor and capital must be efficient in producing objects; but this is not enough, unless the objects produced are also the objects of human desire. Their relative utilities are in proportion to the sum of objects produced, and in proportion likewise to the power of those objects to satisfy the cravings of appetite. We lately saw that the degree of the general productive-

ness of industry is determined by the abundance of the resources which nature places at man's disposal, and by man's knowledge of the ways to utilize them. The relative efficiency of labor and capital is determined by the degree in which the natural resources and the state of the arts open avenues for the advantageous employment of one or the other.

In some cases nature favors the use of labor, and in others, she favors the use of capital. The growth of flax and of hemp, and their preparation for the market, require a great deal of labor as compared with the capital employed. The growth of wool requires but little; so does the growth of oranges, or of olives. Most kinds of garden produce on the other hand more closely resemble flax in this respect; nevertheless asparagus rather resembles oranges and olives. Each country will devote itself to the growth of that crop for which it is best suited, and will supply its wants of other things by exchange. If the people of the country which grows oranges wish for flax, they will obtain it by giving oranges in exchange to the people of the flax-growing country. They will supply their wants of other commodities in the same way. Thus the needs of each country will be supplied in the cheapest manner. The demand for labor, however, will be far greater in the flax-growing country relatively to the demand for capital, and should the supplies of labor and of capital be the same in both countries, wages will be higher where flax is grown and interest where oranges are grown. Or to look at the same thing from another point of view, in order that wages and interest should be the same in both countries, it will be necessary that the relative supplies of labor and capital be different.

As she affords special facilities also for manufactures or for commerce, nature more greatly favors the employment of capital in some regions than in others. The witty Floretines taunted their Genoese rivals with their bare mountains and barren seas. A soil ill adapted to profitable cultivation, and a sea which refused its usual supply of food, left open to the Genoese one only avenue to wealth, namely commerce,—and into that they plunged so earnestly, that Genoa at the height of her glory was among all the cities of Europe probably second in wealth only to Venice. In no trade perhaps does nature require a greater amount of capital in proportion to labor than in navigation, the peculiar trade of the Genoese. Had Genoa possessed no greater proportion of capital to labor than was employed in the agricultural countries with which she traded, the demand for its use would have pushed interest to an excessively high point, while wages would have sunk very low and much labor would probably have failed to get employment. Yet, as a matter of fact, it is probable that laborers were well paid, and that wages were in Genoa as high or higher than elsewhere; for it often happens that the opportunity of using capital to advantage so stirs up the disposition to accumulate it, as to more than counterbalance any disadvantage under which labor might otherwise suffer. But for wages to be increased in this way it is necessary that capital should still more greatly increase.

The differences in the natural resources in different places are permanent; but they can only be practically effective in so far as their aptitudes are known to mankind, and as means are devised to utilize

them. The knowledge how to do this, and the degree of skill in applying that knowledge vary immensely at different times and places. The earliest marine architecture was unequal to the construction of any more important works than hide coracles and dug-out canoes. The labor of the first navigators was thus employed with an instrument of the cheapest kind, produced by a few days' toil. There has been no change in the facilities provided by nature, but the introduction of successive improvements has led to an ever increasing use of capital, until now an Atlantic liner navigated by three hundred men costs perhaps one million dollars, and represents for each man employed a capital of over three thousand dollars, or the equivalent of more than five years labor.

The development of knowledge and skill, or the course of improvements, is the most distinctive feature of industrial progress. It consists to a very great degree in the discovery and adoption of new ways of using capital, and it almost constantly increases the relative demand for capital at the expense of labor. Even such increase in the efficiency of labor as does occur, consists mostly in the acquisition by the laborers of aptitudes for manipulating larger amounts of fixed capital ; it does not often aid labor to supplant capital.

Nature and art indicate what industries are possible, and by what means they may be conducted, but they do not decide which industry or which methods shall prevail. I know of regions which have a marvelous facility for producing Canada thistles, but I have yet to hear of a single farmer who has regu-

larly adopted this branch of agriculture. In utter disregard of the rights of private property, the State of Pennsylvania has even made it a misdemeanor, to have a single specimen of this enterprising vegetable found growing upon one's own estate. The reason is plain. Nobody wants thistles. They minister to no appetites, unless to those of donkeys and goats, animals not highly prized in Pennsylvania. The State of Florida is well adapted to the growth of oranges, and, oranges being a fruit of ready sale, their growth has extended widely. By exchanging oranges for such products of other regions as they desire, the people of Florida satisfy their wants by means of a business which employs large amounts of capital and comparatively small amounts of labor. But if nobody cared to buy their oranges, the people of Florida could not do this. If, for instance, they wished flax, they would in that case have to produce it themselves. Not only would they obtain less flax than they now do, but they would also, and this is the point which interests us here, obtain it only by employing proportionately more labor and less capital than they now employ to obtain the same result. In this way they would enhance the rate of wages at the expense of interest.

The direction of industry will always in the last resort be dictated by human appetites or desires. For it is only in order to gratify them, that industry exists at all, and in obeying their behests it merely fulfils the purpose of its being. The natural resources and the state of the arts only influence the demand for labor, because they define the possible industrial operations from among which desire may select those which are capable of yielding to

it the most congenial and amplest gratifications. Desire siezes upon one or another of these opportunities according to the promptings of inner impulses. These impulses or appetites are a part of the constitution of the human mind and body, and they display the most varied preferences between different objects. If, from among the industrial operations made possible by nature and art, desire chooses those in which labor preponderates, it determines a large demand toward labor and creates a high rate of wages; if it chooses those in which capital is the predominant element, it stimulates the use of capital and enhances the rate of interest.

We now turn to those influences which, while they affect wages and interest in opposite ways, arise, not from differences in the relative utility of labor and capital, but from differences in their relative abundance or scarcity. It would, however, be certainly worse than useless for me to detain you here, in order to demonstrate for the thousandth time, that abundance of capital is conducive to a high rate of wages, and that scarcity of capital permits only of a low rate. This we may take for granted. My business is rather to show in what manner the supply of capital exerts its influence and under what limitations it acts.

The old doctrine of the wages fund is familiar to all. That doctrine in its original and simplest form ignores all influences affecting the rate of wages, except such as arise from the relative amounts of population and of capital. It assumes either that the whole amount of capital, or that some given proportion of it, is divided periodically among the laborers as wages, and that consequently every

change in the relative amounts of capital and of population is followed by an exactly proportionate change in the rate of wages. I do not propose to enter upon a detailed analysis or criticism of this theory. When, however, we consider that every change in the rate of wages produces changes in the demand for labor, and consequent changes in the division of capital between its auxiliary and remunerative uses; and when we observe the manner in which nature, and art, and human desire, variously influence the relative utility of labor and of auxiliary capital, and the demand for their use; and, when we contemplate the varying proportions of labor and capital employed in different occupations, and in different countries, and in different epochs; it becomes obvious that the early form of this theory requires serious modifications, in order to make it tenable at all.

But I shall not detain you in order to ask whether it is possible to restate the wages fund theory in such way as to recognize and account for these facts, and to form a correct explanation of the phenomena of wages; nor shall I enquire whether, if successful, the result would be worth the effort. My purpose is not critical but constructive, and my endeavor is rather to show how the influences arising from the relative supplies of labor and of capital are coördinated with other influences; and to prove, that, assuming perfect competition and perfect mobility of capital and labor to prevail, these various influences join in a tendency, the law of whose action is as certain as any law in Political Economy, however intricate and difficult it may be to follow all the ratifications and subtle workings of its influence.

The supplies of labor and of capital which exist at any time constitute the means whereby wealth is created out of the materials supplied by nature.

The resources which nature affords, in that degree in which their possibilities are known and made available by the state of the productive arts, determine what things can be done, and what are the relative proportions of labor and capital which are needed to do them.

Within the limits of the opportunities which nature and art thus offer, the character of human desires determines which things shall be actually accomplished. Upon their decision depends the relative demand for the use of labor and of capital. The order of their precedency depends upon the relative utility and also upon the relative costs of their objects. In so far as they are guided by appetite only, they stimulate the demand for labor or the demand for capital, according as their objects require more of one or of the other to produce them. In so far, however, as desire gives way to cheapness, and as the choice of its objects is modified by the consideration of their relative costs, it opens the avenue by which the price influences the demand. The reason why desire allows itself to be guided by cheapness is that the power to supply its wants is limited, and that, by considering the relative cheapness of different objects, it can make its selection from among them in such a way as to multiply the gratifications which it obtains.

Into the field of industry designated by nature, and art, and desire; labor and capital, rival applicants for employment, push their way. The infinite variety and number of different operations which fill this

field, range themselves so, that in one end of the field stand those which capital alone can perform, or in which its superiority over labor is uncontested. Upon these capital seizes at once. Labor in the same manner seizes upon those for which its aptitudes are the greatest. These stand in the other end of the field. In an intermediate position stand others for whose pursuit it is less easy to fortell whether labor or capital is best fitted. These must be distributed between labor and capital in such a way that the whole amounts of labor and of capital shall be employed, for otherwise price could not be in equilibrium. They must also be distributed in such manner that labor and capital is each employed where it is most effective.

Somewhere there must be a line, of which it can be predicted, that on one side capital alone will be used, and labor on the other side. Here and here alone their relative advantages are equal; here it may be said that neither possesses any superiority over the other; here either may be employed.

Where this line shall be, and how the division of the field shall take place, depends, in the first place, upon the character of the operations, which under the dictation of nature, of art, and of desire, constitute the field of industry. The character of the field being thus determined, the question as to how much of it shall be held by capital, and how much shall be held by labor, depends upon the relative amounts of labor and of capital. The line of demarcation between them must be so located that it is impossible to substitute labor or capital one for the other in the production of any commodity, in such manner as to lessen its cost. And those

employments in which interchange occurs at equal costs, determine the relative hire of labor and of capital, and determine also the rate at which labor and capital interchange with each other.

In an earlier part of this paper I stated the law of wages as follows :—

The price of a given amount of labor is the same as the price paid for the use of such amount of capital as would replace that labor in those employments where labor and capital are interchangeable, and where either can be used to equal advantage.

I also called attention to the inadequacy of this statement, arising from its failure to indicate what determines the amounts of labor and capital which shall be interchangeable. We are now in a position to remedy this defect, and to do so we may lay down this additional law :—

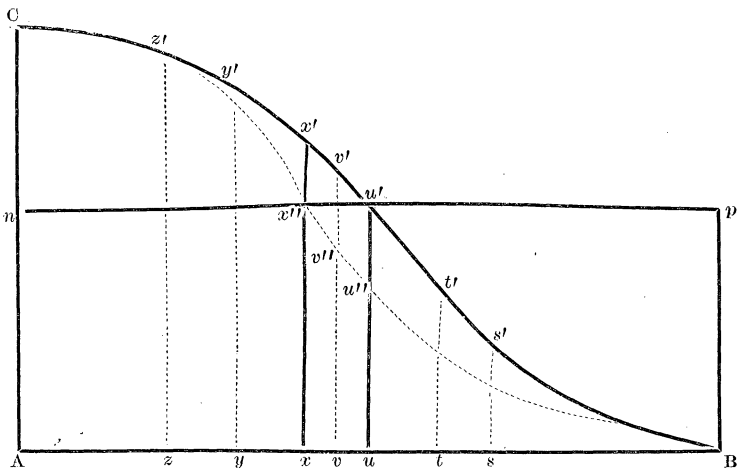
Labor and capital are interchangeable and are used indifferently where their relative utilities merge, or where each may be said to be at its final relative utility. The decision as to the point where this shall occur is due, in the first place, to the relative demand for their use arising from the combined action of nature, art, and desire; and, in the second place, to the relative abundance of their supplies, which distribute themselves over the demand in such way that each is employed in those occupations for which it is best fitted.

The same prices, which are paid for such amounts of labor and capital as are interchangeable in those occupations where they are indifferently employed, are also paid for equal amounts of labor and capital in whatever other employment they may be engaged in.

The amounts of labor and of capital, which are interchangeable at the margin where they are indifferently used form what we may call units of interchange. And if we wish to know how the entire product of industry is divided between labor and capital, we need, when the rate of interchange is ascertained, only to enquire what is the total amount of capital and the total number of laborers. If the labor of one man of a given standard of efficiency is paid as much in wages as $10,000 of capital is paid in interest, then one man and $10,000 will be the units of interchange for labor and capital respectively. And if there are 1,000,000 laborers of the standard degree of efficiency, making due allowance for the fact that some exceed it and that some fall short of it, and if there is a capital of $4,000,000,000, there will then be 400,000 units of interchange of capital as against 1,000,000 units of labor. The proportion of the product which capital receives will then bear to that portion which labor receives the ratio of four to ten or two sevenths.

I will further illustrate by the accompanying diagram the propositions which I have laid down. Let the line AB be made up of the series of the possible operations of industry arranged in the order of the relative amounts of labor and of capital needed in each to accomplish the same result; and let ss', tt', uu', vv', xx', yy', and zz' represent the amount of capital, which will in the case of the operations s, t, u, v, x, y, and z do as much work as one man. The nearer we approach to B the greater will be the advantage of using capital, while as we

recede from B the advantage of using labor will grow at each step. At every imaginable price there must be some point where the advantages of using capital, and those of using labor, are equally balanced, and where either will be indifferently employed. We will suppose *u* to be the point at which the balance of advantage will ultimately settle. The line *uu'* will then represent the unit of interchange of capital,



being the amount of capital which can be interchanged with the labor of one man, and will do the same work and receive the same compensation. The same line *uu'* may also be taken to represent the labor of one man. The space enclosed between the line B*u*, the line B*u'*, and the line *uu'* will represent the total amount of auxiliary capital existing, for it is all employed in the operations between B and *u*. The amount of labor which would be needed to do the same work would be represented by the parallelogram B*uu'p*. As on this side of *uu'* all work is done by auxiliary capital,

so on the other side of uu' all work is done by labor, and the amount of labor needed will be represented by the parallelogram $Auu'n$, whereas to accomplish the same work by capital would require an amount represented by $Auu'C$. I may add, that while the figure pretty well represents the relative advantages of labor and capital in the middle part of the curve, it perhaps fails to show how greatly divergent they are at the extremes; for at the extremes the degree of their disparity is well nigh if not quite infinite, a relation which cannot be portrayed in this figure.

Now let me call attention to the manner in which the action of the various factors which I have mentioned as going to make up the rate of wages may be separately illustrated by this diagram. In the first place the location of the line BC is decided by nature, art, and desire, which things determine both what operations shall be prosecuted, and what the means are by which they may be prosecuted. If nature, art, and desire, instead of causing the line BC to pass through u' and x', should cause it to pass through u'' and x'' in such manner that the figure Bxx'' would be is equal to Buu', the point x and line xx'' would become the place of interchange instead of u and uu'. If, as represented in the diagram, xx'' should equal uu', wages will be unchanged, otherwise they will be raised or depressed, as xx'' happens to exceed or to fall short of uu'. Since, however, labor would be thrown out of employment in the occupations between u and x, a reaction would follow so that the line of interchange would be forced in some degree back toward B, perhaps to vv'', and there would be a corresponding fall in wages and in

the amount of the capital which would now be equivalent to one day's labor.

The location of the line BC, and the character of industry, being once fixed, the division between labor and capital of the different employments repesented by the line AB is determined by their relative amounts. We have supposed uu' to be the line of interchange. This requires that Buu' represent the total existing auxiliary capital and $Anu'u$ the total supply of labor. Were capital however to increase in proportion to labor, so as to be represented no longer by Buu', but by Bxx', then xx' would become the line of interchange, and wages would rise by the difference between uu' and xx', except in so far as the throwing out of employment of the amount of labor represented by $uxx'u'$ would cause a certain degree of reaction, so that a final settlement of equilibrium would occur at v' perhaps.

In describing the effects upon wages of nature, of art, of desire, and of the supply of capital and labor I have enumerated all the element of the wages question. I have attempted also to show how their influences harmonize in the law of wages. So long as their action is uniform equilibrium prevails, and the rate of wages remains unchanged at such a point as, under the existing circumstances, will satisfy that law. Let any one of these circumstances however change, and at once the equilibrium of price, and of supply and demand, will be destroyed, and a train of secondary changes and influences will be induced. Equilibrium can only be restored when after wavering back and forth in sympathy with all these ifluences, the

line of demarcation between the employments of capital and those of labor comes to rest finally in a new location.

This final resting place must always be such, that it is impossible to substitute labor or capital for each other in the production of any commodity so as to lessen its cost. And the character of those employments in which interchange does occur at equal costs, determines the relative hire of labor and capital, and determines also the rate in which labor and capital interchange with each other.

IV.

In this paper I have assumed a state of perfect competition, and absolute mobility of labor and capital; I have neglected the influence of rent, and have disregarded the coëxistence of different qualities of labor, and have overlooked the important function of the undertaker or *entrepreneur* If, by selecting for discussion a single problem, I have attempted to eliminate all disturbing causes, it is not, that I suppose that such disturbing causes are ever absent in real life, or that economic causes ever act *in vacuo*. I do, however, believe that there is an advantage in tracing separately the effects of different causes, and of distinguishing in thought, at least, those tendencies which in life are inextricably mingled. It is with this qualification that I ask your verdict on my work.

Again, if I have spoken of the rate of wages or price of labor as being the compensation of labor measured in the standard of money or of general

value, and not as measured in the food and clothing and other satisfactions which are the true recompense of the laborer's toil, this is not because I fail to recognize that the problem of the laborer's welfare is beyond all comparison the most interesting feature of the wages question; it is because, to arrive at any correct inference, we must travel by the road of causation over whatever paths it may lead. To refuse to do so in the case of wages and labor would only be a spurious philanthropy.

But time warns me to encroach no further on your patience; and easily as the laws of the real remuneration of labor may be deduced from those laws of its price which I have endeavored to expound, I will not prolong this discussion, but will close it now with my thanks for your indulgent attention.